America’s Seed Fund powered by the National Science Foundation
Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR) program
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SOLICITATION TOPICS & SUBTOPICS

America’s Seed Fund powered by NSF encourages proposals in all areas of science and engineering. An exact fit into one of these topics or subtopics is not required.

For proposals due in 2020
For 40 years, America’s Seed Fund powered by NSF has helped startups and small businesses transform their ideas into marketable products and services. We focus on deep technologies — those that are based on discoveries in fundamental science and engineering — and each year, we award about $200 million in funding to entrepreneurs across the country. Our goals are to foster innovation and help create businesses and jobs in the United States. We are a congressionally mandated program — Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR).

Technology Topic Areas

- Advanced Manufacturing (M)
- Advanced Materials (AM)
- Artificial Intelligence (AI)
- Biological Technologies (BT)
- Biomedical Technologies (BM)
- Chemical Technologies (CT)
- Digital Health (DH)
- Distributed Ledger (DL)
- Energy Technologies (EN)
- Environmental Technologies (ET)
- Information Technologies (IT)
- Instrumentation and Hardware Systems (IH)
- Internet of Things (I)
- Medical Devices (MD)
- Nanotechnology (N)
- Other Topics (OT)
- Pharmaceutical Technologies (PT)
- Photonics (PH)
- Power Management (PM)
- Quantum Information Technologies (QT)
- Robotics (R)
- Semiconductors (S)
- Space (SP)
- Wireless Technologies (W)

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Advanced Manufacturing (M)

The Advanced Manufacturing topic aims to support emerging innovations in manufacturing with the potential to stimulate the nation’s manufacturing sector by improving its efficiency, competitiveness, and sustainability. Proposed technology should be environmentally friendly, compatible with human health and planet health, and driven by technological advancements. Examples include, but are not limited to, innovative technologies for the processing of a variety of single-component and multi-component materials, biological and bio-inspired materials, flexible electronics, ceramics, polymers, metals, alloys, and novel composites using a variety of advanced manufacturing processes. Regenerative designs using a circular economy approach (a systemic approach to economic development designed to benefit businesses, society, and the environment) are encouraged.

M1. Additive Manufacturing Components and Systems
M2. Bio-Inspired Manufacturing
M3. Cybermanufacturing
M4. Human-Centric Industrial Technologies
M5. Manufacturing Technologies
M6. Modeling and Simulation
M7. Personalized Manufacturing / Maker Manufacturing / Maker to Manufacturer
M8. Sustainable Manufacturing Technology / Circular Economy Technologies
M9. Transportation Technologies
M10. Other Manufacturing Technologies

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Advanced Materials (AM)

The Advanced Materials topic addresses the development of new and improved materials for a wide variety of commercial and industrial applications. Proposals may focus on the creation of innovative material systems and/or on critical fabrication, processing, or manufacturing challenges involved in the successful commercialization of materials. A broad range of applications areas will be considered as part of this topic.

AM1. Coatings and Surface Modifications

AM2. Materials for Sustainability

AM3. Metals and Ceramics


AM5. Specialized Functional Materials

AM6. Structural and Infrastructural Materials

AM7. Other Advanced Materials Technologies
Artificial Intelligence (AI)

This topic focuses on innovations in the field of artificial intelligence (AI), which refers to intelligence exhibited by machines or software. AI is not a specific technology or technical method — it is instead a field of study aimed at achieving machine-based intelligence. Current AI technologies are targeted at specific problem sets. Artificial general intelligence — machines that can reason like humans — remains a more elusive long-term goal.

AI has the potential to be enormously societally disruptive, and the consequences of its introduction must be carefully considered. Proposers are encouraged to discuss possible negative effects of the proposed technology and how these may be avoided or mitigated.

AI proposals may be submitted either to a broad technical subtopic or under the primary application space, examples of which are listed below.

**AI1. AI-Optimized Hardware (e.g., electronic chips)**

**AI2. Business Intelligence**

**AI3. Computer Vision, Image and Video Processing**

**AI4. Decision Management and Optimization (e.g., enterprise platforms, finance)**

**AI5. eCommerce**

**AI6. Education Technologies**
*Note:* Applicants interested in proposing education-related projects that align with our program goals and criteria, but which are not related to AI, IT, or robotics, are welcome to submit their concepts under “Other Topics.”

**AI7. Human-Computer Interaction**

**AI8. Industrial Systems, including Robotics**
*Note:* This subtopic includes AI innovations pertaining to Industrial Systems. Non-AI innovations related to Industrial Systems should be submitted to the Robotics (R) topic or another suitable topic.

**AI9. Language-Based Technologies (e.g., natural language processing, natural language generation, speech recognition, text analytics)**

**AI10. Machine Learning Algorithms and Platforms**
AI11. Medical Diagnostics

Note: This subtopic includes AI innovations pertaining to Medical Diagnostics. Non-AI innovations related to Medical Diagnostics should be submitted to the Digital Health (DH) topic, the Medical Devices (MD) topic or another suitable topic.

AI12. Sales, Advertising, and Marketing

AI13. Security, Cybersecurity, and Authentication

AI14. Smart Agriculture

Note: This subtopic includes AI innovations pertaining to Smart Agriculture. Non-AI innovations related to Smart Agriculture should be submitted to the Robotics (R) topic or another suitable topic.

AI15. Vehicle-Based Systems

AI16. Virtual Agents and Assistants

AI17. Other AI Technologies
Biological Technologies (BT)

The Biological Technologies topic covers a wide range of technology areas to advance engineering and science innovation across the biological spectrum. Biological technologies have disrupted decades-old chemical, agricultural, and medical products and services, producing a new bioeconomy. Potential breakthroughs in this space are on course to make major socioeconomic contributions to the economy by boosting productivity in industrial and agricultural processes, improving human health, and making advances toward environmental sustainability.

Proposed projects should be focused on using or modifying living organisms, systems, or biological processes to develop novel technologies to produce biochemicals, medical products, and agricultural products. They may involve bioengineering to improve function in molecules, cells, and tissues in humans, plants, animals, and microbes. NSF also encourages proposals for enabling technologies, such as new tools for genomics, proteomics, and drug discovery, the development of instruments for biological applications, computational and bioinformatic tools, and new manufacturing technologies for cells, tissues, organs and biologics.

BT1. Animal Biotechnology

BT2. Bioinstruments

BT3. Biosensors

BT4. Cell and Tissue Engineering

BT5. Computational Biology and Bioinformatics

BT6. Fermentation Technologies

BT7. Food Processing and Safety Technology

BT8. Life Science Research Tools

BT9. Materials for Biomedical Applications

BT10. Plant Biotechnology

BT11. Synthetic Biology and Metabolic Engineering

BT12. Other Biological Technologies
Biomedical Technologies (BM)

The Biomedical Technologies topic aims to support the early-stage development of novel products, processes, or services that will enable the delivery of high-quality, economically-efficient healthcare.

Subtopics are not aimed at supporting or conducting clinical trials, clinical efficacy or safety studies, the development pre-clinical or clinical-stage drug candidates or medical devices, or work performed primarily for regulatory purposes. Limited studies with human subjects may be acceptable to the extent that they are performed in support of feasibility, proof-of-concept studies of early-stage technologies. Proposals that request support for clinical studies will be deemed non-compliant with the SBIR/STTR solicitations and may be returned without review.

BM1. Diagnostic Assays

BM2. Medical Imaging

BM3. Monitoring Devices

BM4. Other Biomedical Technologies
Chemical Technologies (CT)

The Chemical Technologies topic covers a wide range of technology areas of current and emerging commercial significance pertaining to the broad chemical industry, food processing and technology, agrochemicals, chemical alternatives and organics, green chemicals, water treatment and separations, advanced catalysts and materials, and biochemicals. Sensing, data, and advanced analytics technologies relevant to these fields are also appropriate for this topic area. Beyond improvement on technical specifications, it is important to also clearly identify the competitive landscape of what is currently possible, and why the proposed innovation will an impact commercially and/or from a societal benefit standpoint.

CT1. Biochemicals

CT2. Catalysts, Advanced Chemicals and Materials

CT3. Chemical and Environmental Sensing and Data

CT4. Food Processing, Chemicals and Agriculture

CT5. Green Chemicals and Chemical Alternatives

CT6. Separations and Water Treatment

CT7. Other Chemical Technologies
Digital Health (DH)

The Digital Health topic aims to support the early-stage development of novel devices, components, systems, algorithms, networks, applications, or services that will enable the transformation of healthcare from reactive, hospital-centered, and indemnity-based to proactive, person-centered, preventive, and cost-efficient.

Subtopics are not aimed at supporting clinical trials, the clinical validation of information technologies, or medical devices or studies performed primarily for regulatory purposes. Limited studies with human subjects may be acceptable to the extent that they are performed in support of feasibility, proof-of-concept studies of early-stage technologies. Proposals that request support for clinical studies will be deemed non-compliant with the SBIR/STTR solicitations and may be returned without review.

DH1. Clinical Decision Support

DH2. Healthcare System Workflow

DH3. Medical Diagnostics

DH4. Personalized Software Systems

DH5. Other Digital Health
Distributed Ledger (DL)

The Distributed Ledger topic area covers a wide range of technology areas of current and emerging commercial significance and impact spanning all areas of distributed ledger including blockchains, Directed Acyclic Graphs (DAGs), and related capabilities (cryptography, smart contracts, etc.). Applications of these technologies and approaches across any range of industries and commercial uses are appropriate for this topic area. It is important that the proposed project involve novel, distinctive approaches and/or disruptive innovations that enable high potential impact and competitive advantage in its field of use. These subtopic areas are meant to serve as examples of what entrepreneurs may propose in this space; all distributed ledger proposals with technical innovation and significant commercial potential are welcome, regardless of the specific area of focus of the project.

DL1: Autonomous Systems and Economies; Smart Contracts

DL2: Blockchain, DAGs, and Next Gen Protocols

DL3: Convergence with Big Data, and Artificial Intelligence

DL4: Convergence with Internet of Things, Crowdsourcing and Crowdsensing

DL5: Cryptography; Security; Cybersecurity

DL6: Distributed Consensus; Fault Tolerance Mechanisms

DL7: Distributed Ledger in Edge and Cloud Computing

DL8: Distributed Ledger Interoperability

DL9: Distributed Ledger in Network Architecture and Management

DL10: Financial Technologies

DL11: Human-to-Technology Interface; Decentralized Applications (dApps)

DL12: Scalability Solutions; Accumulators

DL13: Trusted Identity; Identity Management

DL14: Other Distributed Ledger Technologies

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Energy Technologies (EN)

Proposals in the Energy topic are encouraged in the areas of new energy sources and resources, power generation, energy storage, and electronic systems for portable energy sources for mobile technologies and off-grid type applications. Proposals in all areas of energy generation are welcome, with an emphasis on how the new idea competes favorably with existing solutions. Proposals in oil and gas and related processes are welcome. Proposals that focus on the intersection of energy technologies and data are welcome across all areas where integrations to energy technology, applications are the primary thrust (including computational technologies). Proposals with ideas on nature-inspired processes for sustainable energy solutions and carbon storage, reducing the carbon and resource intensity of hydrocarbon extraction, energy conversion, and its uses are also sought. Proposals involving energy storage from the scale of wearable devices to power plant, and energy conversion are encouraged.

EN1. Energy Efficiencies, and Data Technologies
EN2. Energy Production and Power Generation
EN3. Energy Storage
EN4. Petrochemicals, Oil and Gas
EN5. Other Energy Technologies
Environmental Technologies (ET)

Environmental Technologies cover a range of innovations that bring the promise of sustainability, high commercial impact and/or societal and environmental benefits. The topic covers a wide range of technology areas of current and emerging commercial significance pertaining to the technologies and materials that improve environmental and/or environmental health outcomes. Sensing, data, and advanced analytics technologies relevant to these fields are also appropriate. If the proposed technology or approach addresses a problem without a current solution or one which is underdeveloped, this should be highlighted.

**ET1. Computational Sustainability**

**ET2. Emission/Waste Reduction and the Circular Economy**

**ET3. Food, Agriculture, and Energy**

**ET4. Habitat Conservation, Adaptation and Restoration**

**ET5. Sustainable Community Systems**

**ET6. Water Treatment, Resilience, and Sanitation**

**ET7. Other Environmental Technologies**
Information Technologies (IT)

The Information Technologies topic encourages the submission of proposals that present ground-breaking innovations in the generation, analysis, use, transmission, or protection of information, where such innovations offer the potential for substantial commercial returns and positive societal impact. The subtopics below provide specific examples of technologies and applications, although given the enormous range and diversity in the field of IT these examples are inevitably incomplete.

**IT1. Big Data and Advanced Analytics**

**IT2. Cloud Computing and High-Performance Computing**

**IT3. Cloud-based IT Services**

**IT4. Cybersecurity, Authentication, and Privacy**

**IT5. Cybersecurity for the Internet of Things**
*Note: This subtopic is focused on cybersecurity innovations pertaining to IoT. Hardware innovations related to IoT should be submitted to the Internet of Things (I) topic.*

**IT6. Education Technologies**
*Note: Applicants interested in proposing education-related projects that align with our program goals and criteria, but which are not related to AI, IT, or robotics, are welcome to submit their concepts under “Other Topics.”*

**IT7. Human-Computer Interaction, Virtual Reality, and Augmented Reality**

**IT8. Image and Video**
*Note: Image- and video-based innovations that rely on the use of artificial intelligence should be submitted under the AI3 subtopic.*

*Note: This subtopic includes IT-based innovations pertaining to Internet of Things (IoT) and Cyber-Physical Systems (CPS). Hardware innovations related to IoT or CPS should be submitted to the Internet of Things (I) topic.*

**IT10. Networking Technology**
*Note: This subtopic includes IT-based innovations pertaining to IoT networking technology. Hardware innovations related to IoT should be submitted to the Internet of Things (I) topic.*

**IT11. Social Media and Collaborative Networking**

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IT12. Software

Note: This subtopic focuses on IT innovations that are embodied in software and provide important new or enhanced capabilities that will usually be generalized, rather than directed to a specific use case. Examples of such capabilities include (but are not limited to): enhanced computational speed or efficiency; new or improved functionality; improved or extended performance; increased ease of use and accessibility. The range of possible innovations under this subtopic is too broad to describe here. Past examples of significant software innovations cover a wide range of technical approaches and resulting new capabilities, and they include (but are obviously not limited to): object-oriented programming; the GUI; HTTP; HTML; TCP/IP; SQL; internet search engine(s); the spreadsheet; word processing; MapReduce; virtualization.

IT13. Other Information Technologies
Instrumentation and Hardware Systems (IH)

The Instrumentation and Hardware Systems topic addresses the research and development of new and improved instrumentation and related systems for a wide variety of commercial and industrial applications. Proposals in this topic may deal with new instruments for use in scientific, industrial, engineering, or manufacturing environments, among others. Types of instruments that will be considered include systems and tools designed for the purposes of detection, manipulation, characterization, measurement, processing, control, and/or monitoring. A wide variety of applications areas will be considered as part of this topic.

IH1. Instrumentation or Hardware Systems for Actuation, Control, and Manipulation

IH2. Instrumentation or Hardware Systems for Detection and Characterization

IH3. Instrumentation or Hardware Systems for Imaging

IH4. Other Instrumentation or Hardware Systems Technologies

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Internet of Things (I)

The Internet of Things (IoT) is a rapidly evolving field that involves the interconnection and interaction of smart objects (objects or devices with embedded sensors, onboard data processing capability, and a means of communication) to provide automated services that would otherwise not be possible. IoT is not a single technology, but rather involves the convergence of sensor, actuator, information, and communication technologies. Emerging IoT implementations will use smaller and more energy-efficient embedded sensor technologies, more sophisticated actuators, enhanced communications, and advanced data analytics to collect and aggregate information and enable intelligent systems that understand context, track and manage complex interactions, and anticipate requirements. Market verticals that are potentially impacted by innovations in this area include connected cities and homes, smart transportation, smart agriculture, industrial IoT, and retail IoT. Proposals are encouraged that address key challenges across the full range of IoT applications involving hardware devices and sensors. Advances focusing on software, cybersecurity, and computing technologies should apply under one of the Information Technologies (IT) subtopics.

I1. IoT Communications

I2. IoT Integrated Systems

I3. IoT Sensors and Actuators

I4. Other IoT Technologies
Medical Devices (MD)

The Medical Devices topic aims to support the early-stage development of novel products, processes, or services that will enable the delivery of high-quality, economically-efficient healthcare in the United States and globally.

The medical devices topic is not aimed at supporting or conducting clinical trials, clinical efficacy or safety studies, the development of pre-clinical or clinical-stage drug candidates or medical devices, or work performed primarily for regulatory purposes. Limited studies with human subjects may be acceptable to the extent that they are performed in support of feasibility, proof-of-concept studies of early-stage technologies. Proposals that request support for clinical studies will be deemed non-compliant with the SBIR/STTR solicitations and may be returned without review.

MD1. Implantables

MD2. Orthopedic

MD3. Rehabilitation Devices

MD4. Sensors

MD5. Wearables

MD6. Other Medical Devices
Nanotechnology (N)

The Nanotechnology topic addresses the creation and manipulation of functional materials, devices, and systems with novel properties and functions that are achieved through the control of matter at a submicroscopic scale (from a fraction of nanometer to about 100 nanometers). This includes, but is not limited to, innovative hierarchical nanostructures, nanolayered structures, nanowires, nanotubes, quantum dots, nanoparticles, nanofibers, and other nanomaterials and biomaterials and their composite structures. Proposals focusing on global technological challenges through development of innovative nanotechnologies are especially encouraged.

N1. Nanomanufacturing

N2. Nanomaterials

N3. Nanotechnology Solutions to Global Grand Challenges

N4. Other Nanotechnologies
Other Topics (OT)

The Other Topics area is intended to be a home to any proposed project that does not seem to fit into one of the other technology topic areas, but still meets the NSF SBIR/STTR goals of supporting research and development of deep technology, with commercial viability and the potential to benefit society. *Potential applicants looking to propose education-related or sensor-related projects that align with our program goals and criteria, but which are not related to a topic, are welcome to submit their concepts under “Other Topics.”*

**OT1. Other Topics**
Pharmaceutical Technologies (PT)

The Pharmaceutical Technologies topics covers a wide range of technology areas to advance the discovery, early-stage development and characterization, formulation, delivery, and/or manufacture of novel drugs, moieties, compounds, products, processes, platforms or services that will improve the selection, quality, or price of pharmaceutical therapies.

The Pharmaceutical Technologies topic is not aimed at supporting or conducting clinical trials, clinical efficacy or safety studies, the development of pre-clinical or clinical-stage drug candidates or medical devices, or work performed primarily for regulatory purposes. Limited studies with human subjects may be acceptable to the extent that they are performed in support of feasibility, proof-of-concept studies of early-stage technologies and must follow NSF policies on research on human subjects (https://www.nsf.gov/bfa/dias/policy/human.jsp). Proposals that request support for clinical studies will be deemed non-compliant with the SBIR/STTR solicitations and may be returned without review.

PT1. Artificial Intelligence for Drug Development

PT2. Cell and Biologics Manufacturing

PT3. Drug Delivery Methods

PT4. Drug Discovery Platforms

PT5. Pharmaceutical Bioinformatics

PT6. Pharmaceutical Manufacturing

PT7. Therapeutic Molecules

PT8. Other Pharmaceutical Technologies
Photonics (PH)

The Photonics topic addresses the research and development of new materials, devices, components, and systems that have the potential for revolutionary change in the optics and photonics industries. Photonic technologies can include anything generally operating in or using photons in the electromagnetic spectrum from gamma rays down to long radio waves. Examples include photovoltaics, lasers, various light emitting diode technologies (LED, OLED, QLED), radiation detectors, and novel communications technologies.

PH1. Advanced Metrology and Sensors

PH2. Advanced Optical Components and Systems

PH3. Communications, Information, and Data Storage

PH4. Lighting and Displays

PH5. Photon-based Energy Conversion

PH6. Other Photonics Technologies
Power Management (PM)

The Power Management topic address the development of novel technologies that enable new power and thermal management solutions. Innovations supported could range from device-scale breakthroughs, to embedded or standalone systems, to grid-scale technologies.

PM1. Energy Harvesting Devices and Systems

PM2. Materials and Devices for Power Electronics

PM3. Materials and Devices for Thermal Management

PM4. Novel Power and Thermal Management Sensors

PM5. Power Management Infrastructure and Smart Grid Systems

PM6. Systems for Thermal Management

PM7. Other Power Management Technologies
Quantum Information Technologies (QT)

This topic focuses on innovations in information and communications technologies that rely fundamentally on quantum mechanical properties and interactions. Typically, such innovations will involve the generation, detection, or manipulation of quantum states to provide faster, more efficient or more secure information processing and communications. Proposals may include innovations at the component, sub-system, or system level that result in substantial and usable improvements in the generation, transmission, detection, storage, or processing of information, or the security and privacy of information. Proposed innovations must offer the potential for robustness, reliability, scalability, and operation at temperatures that are practical within the constraints of the intended application. Innovations at the component and sub-system level should aim for compactness and energy efficiency, consistent with the requirements of the application.

Examples of technology innovations in the quantum computing subtopic could include qubit generation and detection; development of computational models (quantum circuits, etc.); error correction; algorithms; software; hardware sub-systems and systems; and Noisy Intermediate-Scale Quantum (NISQ) computers. Examples of technology innovations in the quantum communications subtopic could include components such as sources, memories, repeaters, detectors; hardware sub-systems and systems; networks; cryptography; and key distribution.

QT1. Quantum Communications

QT2. Quantum Computing

QT3. Quantum Sensing and Metrology

QT4. Quantum Simulation

QT5. Other Quantum Information Technologies

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Robotics (R)

Proposals addressing robot intelligence and experiential learning, particularly those in the areas of high-performance processors or hardware to provide situational awareness, and improved artificial intelligence, are welcome. Innovations in voice, obstacle and image recognition, emotional response, and hand-eye coordination are encouraged. We encourage proposals describing projects that borrow features from other animal nervous systems and include biologists, neuroscientists, and/or psychologists on their team to exploit new knowledge in the study of the brain and behavior. NSF also seeks proposals that address next-generation automation, the flexible and rapid reconfiguration of assembly lines allowing mass customization, the use of advanced control, scheduling, modularization, and decentralization with agile, mobile robotic systems that can enable the cost-effective manufacture of small lot-size products, and on-demand parts manufacturing. Proposals to support the physical and educational needs of individuals with disabilities (e.g., vision, hearing, cognitive, motor related) are sought. Robotic applications in healthcare, smart drones and drone networks are appropriate. Medical devices that provide new capabilities to doctors including surgery; robotic exoskeletons to enhance human strength; personal robots with an emphasis on human-centered end use and interaction, personal caregiving and increased autonomy; and robots of augmentation are welcome.

R1. Human Assistive Technologies and Bio-related Robotics

R2. Human-Machine Interfaces and Control/Architecture

R3. Robotic Applications

R4. Robotics in Agile Manufacturing, and Co-Robots

R5. Robotics in Education

Note: Applicants interested in proposing education-related projects that align with our program goals and criteria, but which are not related to AI, IT, or robotics, are welcome to submit their concepts under “Other Topics.”

R6. Other Robotics Technologies

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Semiconductors (S)

The Semiconductors topic addresses the research and development of new designs, materials, devices, and manufacturing systems that have the potential for impactful change in the semiconductor industry.

S1. Electronic Devices

S2. Electronic Materials

S3. Integrated Circuit Design

S4. Microelectronics Packaging and Systems Integration

S5. Novel Semiconductor-based Sensors

S6. Processing and Metrology Technology

S7. Other Semiconductor Technologies
Space (SP)

The Space topic will seek revolutionary technologies to be deployed outside Earth’s atmosphere to enhance the commercial use of space. Technologies could include innovations that provide cheaper, safer, and more frequent products and solutions to commercial space customers. This topic particularly seeks to support growth-oriented small businesses who have not previously received significant SBIR/STTR funding and are seeking to contribute to economic growth by developing innovative technologies supporting the overall emerging space economy.

Proposals should be addressing real capability gaps or enabling technologies for the space industry, anchored with a solid understanding of the challenges of working in space, including launch, mass and volume restrictions, radiation and thermal environment, communications and latency, power and energy, etc. NSF encourages proposals with revolutionary satellite and vehicle hardware or systems innovations involving propulsion systems, navigation systems, and energy collection and power generation systems unique to space environments, in-space manufacturing systems and services; Earth imaging and sensing; planetary (other than Earth) physical surveying, mapping, and prospecting services; extraction and processes of water and volatiles (not on Earth); and analytic algorithms based on data collected extensively from space-based systems, either alone or in combination with terrestrial systems.

SP1. Extra-terrestrial Resource Extraction

SP2. Geological and Geoclimatic Science Data Technologies

SP3. Ground Launch Sites and Satellite Operations Technologies

SP4. In-space Manufacturing Technologies

SP5. Navigation and Positioning Technologies

SP6. On-Orbit Technologies

SP7. Remote Sensing Technologies

SP8. Space Transportation and Access

SP9. Spacecraft Development and Manufacturing

SP10. Telecommunications Technologies

SP11. Other Space-related Technologies

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Wireless Technologies (W)

Proposals of interest involve next-generation wireless communication technologies requiring systems with high data rates, low cost, and that support a wide variety of applications and services, while maintaining full mobility, minimum latency, and long battery life. Devices and subsystems that increase data throughput rates via cell density, increased spectrum, multiple input, multiple output (MIMO), massive MIMO, and new “antenna” concepts. NSF welcomes proposals involving modulation and demodulation techniques for signal generation and reception through spectral efficiency, noise immunity, jamming immunity, and power efficiency; radio frequency (RF) pollution: device and circuit; processing algorithms/3D spatial control; high efficiency devices such as micro-TWT, smart dust, and inductive couplers. NSF seeks proposals in the areas of spectrum-related research and development activities that improve the efficiency by which the radio spectrum is used, and the ability of all members of the public to access spectrum-related services. Mobile and automotive radar, smart solar panels, on-panel DC-AC converters, and self-testing and self-networking devices are also of interest.

W1. Wireless Devices and Components

W2. Wireless Systems

W3. Other Wireless Technologies